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THE EVOLUTION OF THE MODERN FORMS OF THE LETTERS OF OUR ALPHABET

WITH A PLEA FOR PURE PALÆOGRAPHY.

IT has often seemed to me that the study of the art of writing *an und für sich*, of pure palæography as opposed to applied palæography, if one may use those expressions to indicate two different methods of investigating the art of writing, is sadly neglected. This will be apparent, I think, if we call to mind the end or ends toward which our study of palæography is directed, and the work which we actually do in this field. Our first object in pursuing the subject is to learn how to expand abbreviations, and to read the common scripts—this for the purpose of acquiring some facility in simply reading an original MS. Then we study the shapes which the several letters, or combinations of letters, take in different periods and countries; we examine the scribal practices of different schools in the matter of using initials and ornaments, and we learn something about the history of ink, papyrus, parchment, and paper, about the division of the page into columns, and about other similar matters, so that, when we take up a MS, we may form an intelligent opinion on the question when and where it was written. We try to acquire some acuteness in distinguishing different inks and the hands of different correctors; in diagnosing the scribal weaknesses and the besetting sins of a given copyist; in noting the points at which he has evidently gone astray, either on account of his own ignorance of Latin or his unfamiliarity with the script which he was copying,

or because the text before him was illegible. Our purpose here, of course, is to get back as near as possible to his archetype—to the text which he was trying to follow.

The same process, some steps only of which have been here indicated, we follow with another MS, and then another, until we have covered all those which are available. Thereupon we make a comparative survey of them all; we reject those MSS which are worthless for the purpose in hand; we arrange the rest in family groups on the basis of common ancestry, and we determine the comparative value of the several families and the members of each family. From these results we proceed to reconstruct a text which shall represent as nearly as possible that left by Cicero or Livy.

All this is necessary, and one may freely recognize the fact that the primary value of palæography lies, and should lie, in its use in restoring a text, but it is unfortunate that we should stop at this point in our study of it. It is unfortunate that we should give almost all our attention to the study of applied palæography, and very, very little to the investigation of pure palæography. We have handbooks and collections of facsimiles which give us this working knowledge of the science of writing which I have described above; the introductions to our classical texts and our classical journals give us collations of MSS and papers based upon the application of palæography to difficult passages in a text; but one very rarely sees discussions of palæographical questions dissociated from their practical application in restoring a text, and yet as a pure science palæography furnishes a discipline which in some respects can hardly be excelled.

Furthermore, handwriting in its development, like all the other arts, reflects the temper and tastes of a period, the characteristics of a race, a nation, a school of learning, or an individual, in a most illuminating fashion. We study every other art historically and for its intrinsic value, and we consider the art of a given period as an expression of the temper of the times. In other words, we study its development in the light of contemporary social and political history. The art of writing has not the importance for us which literature, or pictorial art, or

architecture has, but it has an independent value, and deserves to be studied for itself; and the method of study which is applied to the other arts is equally applicable in this field. In the case of palæography, when a script is so novel in form, or when a change in style is so extraordinary, that it challenges even a languid attention, we may stop for a minute to consider its historical setting. The script of Tours, for instance, by its extraordinary beauty and symmetry, or later Roman cursive or Merovingian texts by their complex awkwardness, may call so loudly for an explanation of their existence that we make some effort to find one; but we rarely stop to consider how the social or political changes of a period, or the characteristics of a nation or a race, are reflected in handwriting, or to ask ourselves through what stages *ARMAVIRVMQVE* developed into *armavirumque*, and how and why the successive changes took place.

We rarely bring the script of the *Aufschriften* into vital relation with that of the *Inschriften*, or try to estimate the influence of the book hand and the diplomatic hand upon each other. Our study of the three scripts is carried only to the point where it will be of service in reading and interpreting inscriptions, classical manuscripts, and documents, respectively.

To come back to what was said before, we content ourselves with the bare facts of palæography, in so far as they are of practical use in text-reconstruction. The case would be the same in the field of syntax, if we contented ourselves with such a knowledge of the inflectional forms and their meanings as would enable us to read Greek, Latin, or German, but took no interest in finding out how one syntactical relation developed out of another. Syntax, like palæography, is of most value for the service which it renders in another field than its own, but that fact does not by any means rob historical syntax or historical palæography of its own peculiar and independent interest, and the mere arrangement of phenomena in the correct chronological order, which is all that our treatises on palæography attempt, does not make the study of that subject historical any more than a similar method of studying grammatical constructions constitutes historical syntax.

This is a long introduction for a short paper, but it may be excused in part by the fact that one of the purposes of the paper is to illustrate the value of pure palæography by a brief and modest excursus into that field.

The point which I wish to present in it is that in the development of writing the working of the principles of evolution is shown more fully and more simply than in any one of the biological sciences, and that proposition I should like to illustrate from the history of certain letters. The letters which have been selected for the purpose are: A, B, D, G, H, N, Q, and R. It will be most convenient to begin with Q, because the development of that letter is simplest.

The theory of evolution as applied to biology starts with the fact that, given a single species at the outset, nature tends to produce in course of time new representatives of that species which differ slightly from the original type. This is exactly what happened in the evolution of the letter Q. The form which we find in the earliest Latin inscriptions is a circle, or an oval approaching very closely to a circle, with a tangential affix drawn horizontally to the right from the bottom of the circle (Q). This primitive type threw off as variants the three main varieties Q, Q, and Q. The first two of these gave rise to the sub-varieties Q and Q, in which the tail was in some cases so prolonged as to extend under three or four of the letters to the right.

Let us look first at those forms in which the point of contact between the affix and the circumference of the ellipse was pushed along the base of the curve toward the left. Out of variant No. 1 developed next a form in which the pendant was drawn downwards, viz., Q, and this form gave rise to such modifications as Q, Q, and P, and ultimately to what is essentially a new type, J, with the affix drawn downward to the left. Variant No. 3 became one of the accepted forms of the initial, and gave rise to our capital Q, so called. Next to J stands Q, in which the stroke has reached the lower left-hand corner of the oval. This is the farthest point to which it went in its progress to the left.

Now let us return to the original type, **Q** , and follow the affix in its advance in the opposite direction, that is, upward along the circumference. We find the pendant first starting at various points between the base-line and the top of the circle, **Q** and **Q** , until finally it reaches the top of the circle in the typical form **Q** , which, in turn, threw off a number of subvarieties, **Q** , **Q** , **Q** , **Q** , **Q** , and **Q** . I ought to say in passing that all of these forms have been arranged, not in chronological order, but in the order of development; that is, an attempt has been made to connect each form with its immediate graphical ancestor, so to speak, and not with the form which happens to precede it chronologically in extant inscriptions or manuscripts. In this way, although the ends of the series, like **Q** or **Q** , in which the stroke starts from the left-hand side and is perpendicular, or in which the circle has become essentially a horizontal line, seem very far removed from the primitive form **Q** , the connecting links make the line of descent apparent. I have ventured to say above that the working of the Darwinian principles is shown more clearly and more intelligibly in the development of writing than in the field of biology. That statement is substantiated, it seems to me, by interpreting the facts which we have just noted. The biologist accepts the variation of species as a scientific truth, but he can offer no adequate explanation of it. The factors which come into play are so many and so elusive, and the possible combinations of them so numerous, that finite intelligence cannot yet, at least, take them all into account. In dealing with the development of writing the cause of the variation is reasonably clear. These graphical variants which we have been examining are the intended productions of the individual copyist. They reflect his temperament, or a conscious purpose or an unconscious tendency on his part. If you push the investigation a step farther back, and ask why he had such a temperament, or showed a given desire, or followed a certain tendency, we cannot give a complete answer, and yet, as our investigation proceeds, I think we shall be able to find the motives which controlled his action, and so gave rise to the development of all these forms. Thus far we have seen how the first great principle, the tendency to vary the

original type, worked itself out in the development of the letter Q.

The second truth established by Darwin and others in this connection is that, given an original type and several varieties, that variety or those varieties which are fittest to survive *will* survive. What factors determine the fitness to survive of a graphical form? They are in the main legibility, beauty, economy of effort, and economy of space. In one set of circumstances it is one of these factors, in different circumstances it is another, which exerts the preponderant influence, and determines the character of the resultant form, just as in the animate world one variety is best adapted to survive in one environment and another variety meets better a different set of requirements. The slave, or the monk, who is copying an edition of Horace for the Mæcenas of his time, will pay little heed to economy of effort or space, but will aim to secure beauty and legibility. When he comes to the initials at the beginning of the books or at the tops of the pages, he will sacrifice even legibility, and show an utter disregard of time and space, so to speak, so that, assuming the general character of the symbol to be fixed, the only efficient motive which influences the copyist will be a desire to produce a beautiful or symmetrical letter. With the clerk who is transcribing a *senatus consultum* for the archives, or the engraver who is cutting it in bronze, legibility will probably be the controlling consideration. The loungeur, on the other hand, who is scratching a sentiment on the outer wall of a Pompeian house, will sacrifice beauty, legibility, and space to his desire to save himself trouble.

The free play of these four controlling motives was hindered or facilitated by tradition and by the use of one material or another. The reverence for the Bible and for Virgil was so great, for instance, that a copyist felt himself almost compelled to adopt one of the non-cursive hands, like the square capital or uncial, and use the approved forms of the letters of these alphabets. As for the different materials, bronze allows more freedom of movement than stone, wax surpasses bronze in this respect, and letters can be *painted* on a hard surface with still greater ease. The freedom of movement which one of these materials


allowed when compared with another found expression in the reduction of angles to curves, in the failure to follow a fixed type closely in forming a letter, and in the comparative disregard of uniformity within a document. If we take almost any pair of inscriptions, of an early date, found in the same place, and equally formal in character, one of which, however, is engraved on stone and the other on bronze, we can observe all three of the differences noted above. The bronze tablet will very likely show the curvilinear **ε** in place of the rectangular **Ε** of the stone. It may offer a **τ** composed of two wavy instead of two straight lines, as required by the strict-capital type. In it we are likely to find both the capital **Μ** and the uncial **Ϻ**. The interrelation of the epigraphical and the manuscript hands has not been fully recognized and sufficiently studied. In one respect, in particular, the influence which the script used on permanent material had upon the book-hand has been misunderstood, as it seems to me. We commonly assume that the letters cut by an engraver in stone will be more angular than those drawn by a copyist on papyrus, and, therefore, we naturally conclude that the influence of the epigraphical script will make for angularity. Yet it is doubtful if this assumption is correct. In point of fact, there is considerable reason for believing that at a comparatively early period under the empire the letters of an inscription were commonly outlined on the surface of the stone with a brush. The introduction of this practice would have the effect of reducing angles to loops, and the influence of the epigraphical script upon the book-hand would be away from rather than toward angularity.




If we compare the two materials which were commonly used for literary purposes, papyrus and parchment, we shall find that the surface texture of a sheet of papyrus was nearly the same over the entire piece, but that on parchment a stroke of the pen in one direction was with the grain, while in the opposite direction it was against it. As the letters of the alphabet in their evolution, other things being equal, followed the line of least resistance, on *a priori* grounds we should expect to find that the peculiarity, just noted, of the surface of parchment would act as a restraining influence on the free development of the papyrus script; or, to









put it in another way, since parchment drove out papyrus, we should not be surprised to see the line of development which the letters followed during the papyrus period turn aside, when the new material came into common use. This fact will be illustrated later in specific cases.


To pass to another point, some materials are comparatively cheap, so that in using them economy of space is not an important consideration. We shall expect to find, for instance, greater lateral extension in the script used on papyrus, or on paper, than on parchment. In so far as economy of effort is concerned, the practice of employing monks as copyists introduced an unusual economic factor, because in most cases the prior or abbot set them to work, not primarily for the sake of reproducing the classics, but in order to save the monks themselves from idleness. *Individual* copyists in the monasteries may have been careless and hasty in their work, but a desire to save labor was not an active influence with those who *directed* the work. It would be interesting to follow out in detail some of these modifying influences, and to trace their effects in the development of the various scripts, but that would take us too far from our immediate purpose, and, after all, the primary factors which have determined the general trend of development, and without which secondary agencies, like the influence of tradition, or the cost and the character of the material used, would have had no effect at all, are the four factors mentioned above, viz., legibility, beauty, economy of effort and of space. It is also true that in ordinary writing the form which satisfies best in their order of importance these four requirements will survive, and this brings us to the second dogma in the doctrine of evolution.


With the secondary influences in mind which we have just been discussing, let us return to the scribal "sports" of *Q* to see which of them meet best the four requirements mentioned above, and which are consequently the fittest to survive in every-day use, taking up first economy of effort. In estimating the comparative ease with which the various forms of *Q* could be made it is necessary to bear in mind the fact, already noted, that the alphabet was developed in its later stages on parchment, that


upward strokes on this material are against the grain, that the pen would not move smoothly in that direction, and that consequently those forms could be most easily made which were composed of downward strokes readily drawn. In a well-known capital text of Virgil of the sixth century, preserved in the Vatican, the letter is clearly made with three strokes, .¹ The form











 probably has the same number. Perhaps  and  are painted forms only, but, had they been made on parchment, would probably have required three and four strokes, respectively.



Forms ordinarily made by the copyist in two strokes, as can be seen in the MSS, were , , , , , , , , and


.² In the facility with which they could be made, then, the forms of the second group had an advantage over those of the first. They could also be readily joined to preceding and following letters when writing became continuous. When paper, whose

surface is equally smooth in all directions, came into use, the advantage of the second group of forms was still greater, because they could be drawn by a continuous stroke, without taking the the pen off. Even at an early period, on papyrus, whose surface resembles that of paper, the single-stroke letter appears, as a fragment of one of the Herculanean rolls offers the form .




When the one-stroke letter comes in,  would be likely to drop out of the competition, because the pen must change its direction in adding the affix. Another factor, as we shall presently see, eliminated it before this influence made itself felt. The types which meet the test of economy of effort are, therefore,

, , , , , , , and , with its carelessly finished variants  and .

Let us now examine the various forms of  from the point of view of legibility, beauty, and economy of space. The original type  is open to the objection that if the horizontal stroke is very short, it is hard to distinguish the letter from O, for a letter to be legible must be not only simple in form, but also easily distinguished from other letters. The objection on this score to

 with a short affix becomes still greater when the letters, to

¹ The strokes are left unjoined to show the method of formation.

² The forms , , and  are probably not found on parchment, and may be left out of consideration here.

save space, were reduced to minuscule size. The form **Q** may well have failed of acceptance for the same reason, that is, because of its likeness to **O**, especially in the minuscule size. Then, too, it would require great care to insert the affix. To return to the type **Q**, if the horizontal stroke is a long one, it occupies too much space. The difficulties which we have just discussed stood in the way of the adoption of **Q**, **Q**, **Q**, **Q**, **Q**, and **Q**. The forms **P** and **P** are illegible because they are likely to be confused with **P** (i. e., with the letter which follows **O**). The forms **A**, **C**, and **7** would be rejected because they are unbeautiful and unsymmetrical. The shape **q** is also unattractive. As for **q**, it is legible, but it lacks grace, and it does not stand firmly on the base line. We are left with **Q**, **q**, and **q**. Of these three forms, which are variants from the same type, the second requires less space than the first, and it stands more firmly on the base line. For these reasons it has the same advantage over the first form that the **b**, **d**, **f**, **h**, **l**, and **p**, made with a perpendicular downward stroke, have over the forms of these letters which are drawn with a slanting stroke. The form **q** has a slight advantage over **q**, whether the latter be made with a closed or open loop, in that, when it is joined to a following letter (**qr**), it is easily distinguished from **q**, whereas **q**, so connected (**q**), is almost indistinguishable from it. The form **q** has then an advantage over all the others in its economy of space, its symmetry, and legibility, and at the same time, as we have tried to show above, it is one of the shapes which is most easily made and connected with letters preceding and following it. It has the four qualities required in a letter, and is therefore, the one most likely to triumph, as it actually does triumph, over all its rivals. This form was readily adapted to use in a continuously written hand by drawing a stroke from the bottom of the letter to the next letter, thus, **qr**.

Now, in the process of evolution certain animal or plant types which have been crowded out by some other type or types survive on some island where they have not been brought into competition with the prevailing type, or in some environment for which they are better fitted than their otherwise favored competitors.

So the variants *Q* , *Q* , *Q* , and *Q* , while losing in the struggle for a place in the body of the texts, found islands of refuge in the initial or capital position. In fact, the novelty of their shapes as compared with that of the form regularly used, and their adaptability for decorative purposes made them fitter to survive in these positions than the accepted minuscule form. Their struggle for existence even in these favored localities is still going on, and there are some indications that in handwriting at least they may disappear altogether. *Q* made large, for instance, not infrequently appears as a capital.

The working out of the principles of evolution can be traced in the development of each of the letters in the same way as we have traced it in the case of the letter *Q*, but a detailed examination of them is unnecessary. If the different forms of the several letters be arranged in the order of development, the process of evolution and the controlling influence of the four factors above mentioned will be apparent. The process by which the capital letters *C*, *E*, *F*, *I*, *K*, *L*, *M*, *O*, *P*, *S*, *T*, and *V* have developed into their commonly accepted minuscule printed forms *c*, *e*, *f*, *i*, *k*, *l*, *m*, *o*, *p*, *s*, *t*, and *u* is reasonably clear without comment. The history of *A*, *B*, *D*, *G*, *H*, *N*, and *R* in their development into *a*, *b*, *d*, *g*, *h*, *n*, and *r* is not so apparent. Consequently we shall give our attention to this group only.

The principal varieties of *A* resulted from the different positions given to the hasta, and from the variation in length of one or the other of the upright strokes. Some of the typical forms of this letter in the capital script are *Λ* , *A* , *Α* , *Π* , *Λ* , *Λ* , *Λ* , *Λ* , *Λ* , and *Λ* . The one which, with a slight modification, proved to be the fittest to survive was the last of the series shown here, viz., *Λ* . This form could be made in two strokes, and that it was so made is clear enough from the MSS.¹ It involved an upward stroke, it is true, but this difficulty was minimized by making that stroke very light, or by going part way back on the short downward stroke. This led to a thickening of the line at the bottom of the short downward stroke and facilitated the substitution of a loop for the acute angle at that point. Now, by

¹ Cf., for instance, ZANGEMEISTER AND WATTENBACH, *Exempla*, etc., No. 17.

developing the long right-hand straight line into a curved stroke, the copyist made the letter more symmetrical, made it stand more firmly on the base line, and the modern printed minuscule *a* was obtained, which readily became *ɑ* in a continuously written hand through the desire to save labor.¹

The development of *H* was similar. The position of the hasta and the relative lengths of the upright strokes are again the varying elements, and the forms *H*, *Η*, *Η*, *Η*, *Η*, *Η*, *Η*, *Η*, and *Η* result. The successful type developed out of the last form. This, as it stands, requires three independent strokes. If, however, the right-hand upright be terminated at the hasta, and the right angle made by those two strokes be converted into a curve, *h h*, we obtain a letter which may be made without taking the pen off—a letter which is also symmetrical, similar in character to the other approved letters, legible, and economical of space.

The development of *N* follows that of *H* so closely that it needs no comment. The minuscule *d* comes merely from an effort to economize labor, and to bring the shape of the letter into harmony with *b* and *h* — *D*, *Ḑ*, *Ḑ*, *Ḑ*, *Ḑ*, *Ḑ*.

An examination of the Pompeian graffiti and of the inscriptions painted on the walls of Pompeii seems to indicate that *B* was ordinarily formed in this way: the perpendicular stroke was drawn from above down to the base-line. Then the lower arc was formed immediately, without removing the pen, and without returning to the top of the perpendicular, as we ordinarily do today in forming capital *B*, so called. Then the upper arc was formed. The careless writer, however, failed to finish the upper curve, and we find at an early period such forms as *Ḃ* and *Ḃ*, until finally the upper arc dropped away altogether—*b*. The slight modification (*Ḃ*) which this form required for convenient use in a continuous cursive script is apparent without comment. If in making *B* we draw the arcs first, another development is possible, viz., *Ḃ*, *Ḃ*, *Ḃ*, *Ḃ*,² and this last form, which is

¹ It is interesting to notice that *ɑ* appears sporadically (cf. Z. & W. 31, of the seventh or eighth century), while the *a* was still in the process of development.

² I have found only the first and last forms of this series. The second and third are suggested as possible connecting links between the others.

actually found in Pompeii, had perhaps the history indicated but it could not survive because of its similarity to d (D).

The printed form g seems far removed from G, but the connection between the two is established by this series: G, G, G, G, S, S, S, S, S, S, g; or, by this one: G, G, S, S, S. I need not say that all of these forms, as in fact all of those given in this paper, except the two forms of b assumed above, actually occur in inscriptions or MSS. The governing factor in the last case seems to have been legibility. The cursive g has of course come from the prolongation of the affix and the closing of the arc—G, G, g. With the closure of the arc it was necessary to throw the downward stroke back—thus, g—to distinguish it from q.

The significant stages in the development of printed r are R, R, R, R, and Y. The controlling factor here is the same as that which prevailed in the case of B, viz., a desire to economize effort. The genesis of R is evident (R, R, R, R, R).

It would be interesting to stop and consider what parts of the Roman empire furnished the most favorable environment for the production of these graphical "sports," and in what periods they flourished in the greatest number and variety, but such an investigation is reserved for a subsequent paper. I cannot bring this discussion to an end, however, without noting the fact that the development of the art of writing has been due in the first instance to the careless, the eccentric, and the hasty scribe—to the loungee at Pompeii, to the boy on his way home from school, who stopped to scratch the alphabet on the wall, and to the careless accountant, secretary, or monastic copyist. They dared to originate forms which the engraver or the trained copyist would never have thought of inventing, or have dared to introduce. They were the true reformers in whose footsteps *longo intervallo* the professional scribe timidly followed.

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